

5.—NEW SPECIES OF APIOCERIDAE (DIPTERA) FROM WESTERN AUSTRALIA.*

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INTRODUCTION.

The family Apioceridae is a small group of Asiloid flies of which the known species occur in North and South America, South Africa, Australia and Borneo. It would appear that Australia has a far greater number of species than any of the other countries. A number of species occurs in Eastern Australia, whilst in Western Australia the writer can recognise at least eleven species, some of which are described in this paper. As the flies appear to favour a somewhat arid region with sandy country, and hence as much of Australia is an eminently suitable environment for them, such a diversity of species is not surprising, and it is reasonable to anticipate that future investigation will yield many more forms. No doubt the number of species described from other countries will also be greatly increased.

Hitherto only the genus *Apiocera* has been recognised in Australia; but two species described in this paper belong to a new genus related to *Rhaphiomidas* O.S. In view of this addition to the knowledge of our fauna, previously published statements of family characters for Australian forms are now found to be somewhat restricted, taking account as they do only of the genus *Apiocera*. Consequently a revised synopsis of family characters to cover known Australian species has been included.

FAMILY APIOCERIDAE.

Generally dull-coloured flies, medium to large in size, varying in degree of vestiture from almost bare to hairy.

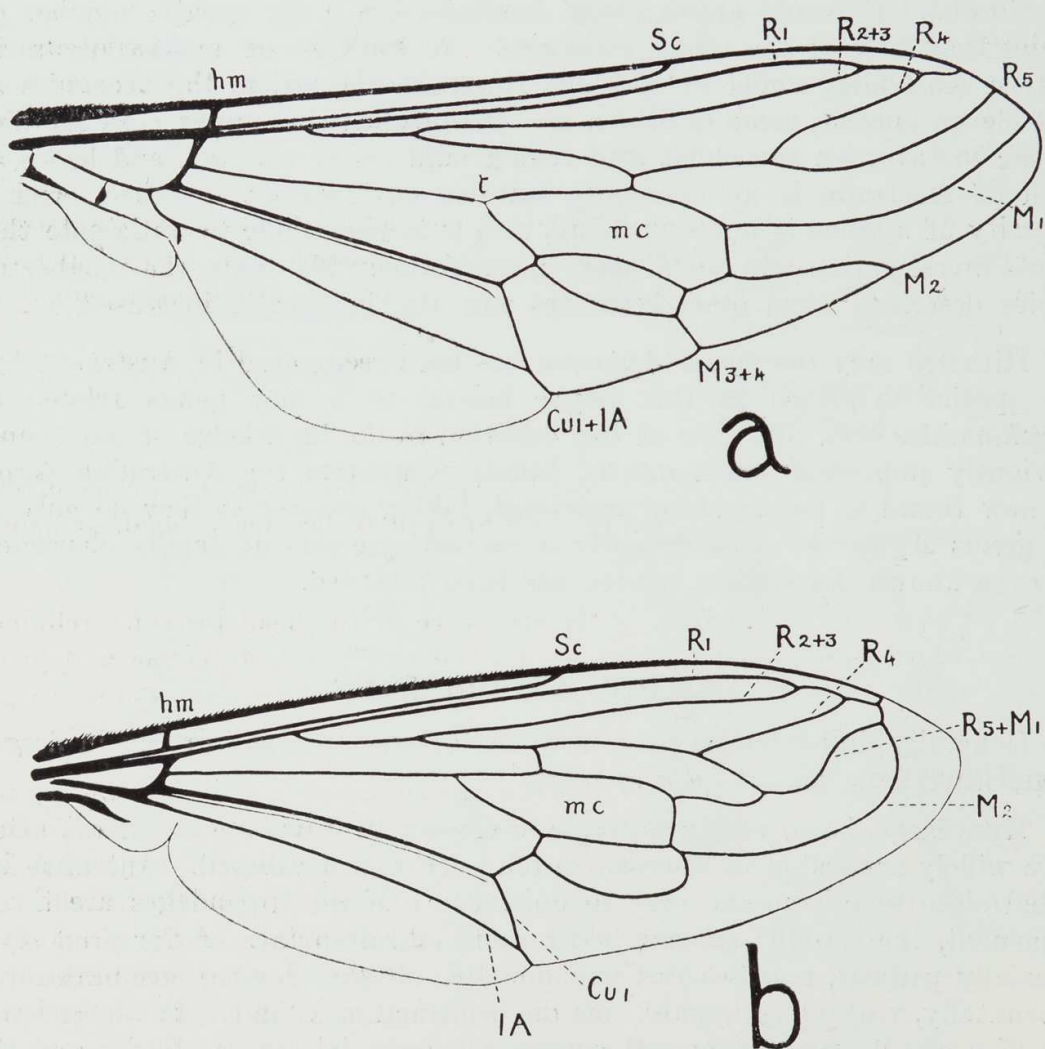
Eyes large, bare, widely separate to closely approximate at vertex; often more widely separated in female. Ocelli very well developed. Antennae inserted close together very near to epistome. These appendages are three-segmented, the second segment being short and globular. A terminal style is usually present, mostly short and pointed. Proboscis projecting forwards horizontally, varying in length from one to four times the length of the head. The flies are flower-feeders and consequently the labella are fleshy and the proboscis non-piercing. Palpi large and two-segmented or small and composed of a single segment. Maxillae correspondingly long or short.

Thorax generally stoutly built. Prothorax often with a circle of spines above. Thoracic macrochaetae may be well developed, weak, or absent. When present, bristles are confined to the lateral edges of the thorax (humeral, notopleural, supra-alar, post-alar, and scutellar). Pleura devoid of bristles.

* Part of this paper was written whilst the author was studying under a Hackett Studentship at the University of Western Australia.

Legs long and bristly, resembling those of Bombyliidae. Empodium absent, pulvilli well developed.

Wings: The characteristic feature of the wing-venation for the family is that R₄, R₅, and M₁ curve forwards and end before the apex of the wing. Subcosta distinct, extending beyond halfway along the wing. R₁ extending to near apex. R₂₊₃ terminates on R₁ and sometimes also R₄ and R₅. M₁ ends before apex, M₂ before or after apex. M₃ fuses with M₄ to form a closed cell behind the median cell; from this a compound vein M₃₊₄ may arise and run direct to wing margin. Cu₁ strongly developed, meeting 1A at wing margin or a short distance before it. (A genus of this family, *Apomidus*, was described by Coquillett from North America, and his specimen differed from *Rhaphiomidas* merely in having the anal cell open, a character only doubtfully of generic value). Cu₂ present, very weakly developed.



TEXT-FIGURE I.

- a. Wing of *Apiocera* sp. (t—median thyridium).
- b. Wing of *Neorhaphiomidas hardyi*, gen. nov., sp. nov.

Abdomen varying in shape, generally broad basally, tapering distally; eight basal segments easily visible. Macrochaetae of abdomen weak or absent. Male terminalia with upper and lower forceps developed. Female terminalia with a double row of spines.

Habits:

Apioceridae are found for the most part in sandy areas of light rainfall. The adults are usually observed perching on bare sand, but sometimes on vegetation. To judge from the nature of the proboscis the flies are essentially flower-feeders. The writer has not seen any record of the species of *Apiocera* being taken at flowers, and of the species which he has collected in the field only one was directly observed visiting flowers. Indirect evidence of the feeding habits is readily obtained by an inspection of the proboscis and palpi, which in dried specimens can frequently be seen, even after years of preservation, to be sticky with honey, or coated with pollen.

Species of *Apiocera* are extremely powerful on the wing and very wary. Mostly they make a shrill note in flight and several specimens of two different species when kept alive in match-boxes or glass vessels have been noticed to produce a shrill buzzing note without beating the wings, as do many Tabanidae.

Painter (²) records that the North American species may run swiftly over the ground. Of five or six of the local species observed in the field by the writer none have been noticed to run. The only ambulatory movement seen was a slow crawling on the part of one female.

The two species of *Neorhaphiomidas* gen. nov. described in this paper are much less agile than *Apiocera*, and easier to capture. *N. hardyi* sp. nov. has been observed visiting flowers of pink myrtle (*Hypocalymma robusta*) and is possibly a wasp mimic.

Specific Characters:

Colour affords an unreliable basis for specific diagnosis, as species often exhibit a certain amount of variation and are apt to become rubbed, or after preservation, greasy.

As pointed out by Hardy (¹), the structure of the head provides reliable specific characters in the shape and proportions of palpi, antennae and proboscis. Width of vertex in conjunction with these characters is also valuable in taxonomy.

Proboscis-length is extremely difficult to determine accurately, owing to the shrinkage which may occur on drying, and the absence of a suitable standard point at the base from which to measure. In this paper the method has been adopted of measuring the distance from the tip of the labella to the proximal end of the strongly chitinised ventral surface of the proboscis (theca). Basally this passes rather suddenly into soft flexible membrane, to the wrinkling of which most of the contraction is due. In specimens obviously of the same species the proboscis may appear to differ tremendously in relative length, but when the theca is measured a good agreement is generally found. All measurements of the proboscis of *Apiocera* in this paper are made from tip to the point in the mid-line where the soft membrane begins.

Male terminalia, again as pointed out by Hardy, do not offer very many characters of use to systematists, many species being very similar in this respect. A few, however, are very distinctive. The structure of the clasper yields useful characters.

Life History:

The nature of the larval and pupal forms of this family is as yet unknown, and as with all seasonal flies with terrestrial larvae, is rather a difficult problem to investigate.

The following observation on oviposition made at Two-People Bay, near Albany, indicates that the larvae are terrestrial, as might have been surmised.

A female of *Apiocera* sp. was observed ovipositing in the rut of a well-worn car track. The insect alighted near the middle of the track and crawled towards the edge, coming to rest where some plants cast a shade on the sand. The tip of the abdomen was bent downwards and forced into the sand to a depth amounting to about one-quarter of its length. Thus it remained for perhaps half a minute, the abdomen undergoing movements of contraction. The abdomen was then withdrawn, and the depression left filled in by a rapid kicking movement of the hind legs. The female then took to the wing and was secured and kept alive.

Digging revealed the fact that the soil was rather compact at the place of oviposition, and also slightly moist. The egg was found to be of an oval shape typical of Diptera, with shining chorion, bright orange in colour and apparently rather soft. After several days in captivity the female was found to have laid a similar egg in the corner of the box. Unfortunately neither of the eggs gave rise to larvae.

Affinities:

Those features in which *Rhaphiomidas* approaches Mydidae are very probably convergent characters rather than signs of affinity. In important details of anatomy *Neorhaphiomidas* is definitely an Apiocerid.

Hardy (⁵) from his studies in the phylogeny of the terminal abdominal structures is of the opinion that Apioceridae are so close to Asilidae that further research may render it necessary to reduce this family to a sub-family of equal status with Asilinae and Dasygogoninae.

Types:

The type specimens will be deposited in the Perth Museum, Western Australia.

Measurements.

Included in this paper is a table containing the exact proportions of the head-capsule and its appendages for the species described. Proportions mentioned in the text are convenient approximations.

KEY TO GENERA OF APIOCERIDAE FOUND IN AUSTRALIA.

- Palpi large and two-segmented, M2 if present,
ends separately after wing apex.....*Apiocera*, Westwood.
- Palpi, small, composed of a single segment, M2
fuses with R5 + M1, and this complex vein
ends on R1 well before wing apex.....*Neorhaphiomidas*, gen. nov.

TABLE EXPRESSING PROPORTIONS OF HEAD-MEASUREMENTS, TAKING HEAD-WIDTH AS A STANDARD.

Species.	Sex.	Head-width. mms.	Proportional Measurements.						
			Head-Width.	Head-Height.	Head-Length.	Separation of Eyes.	Proboscis-Length.	Palpus-Length.	Antenna-Length.
<i>Apiocera deforma</i> sp. nov. ...	Male	4.18	100	75	45	23	95	54	36
	Female	?	100	?	?	?	?	?	?
<i>Apiocera pica</i> sp. nov. ...	Male	4.70	100	69	39	19	87	47	40
	Female	5.07	100	63	43	33	81	47	39
<i>Apiocera tonnoiri</i> sp. nov. ...	Male	4.42	100	82	43	5	62	40	38
	Female	4.51	100	76	40	23	66	40	36
<i>Apiocera pallida</i> sp. nov. ...	Male	3.58	100	69	41	29	77	46	43
	Female	3.71	100	65	42	41	74	48	41
<i>Apiocera minor</i> sp. nov. ...	Male	2.51	100	67	50	41	96	55	59
	Female	2.94	100	66	49	44	93	54	57
<i>Apiocera newmani</i> sp. nov. ...	Male	2.55	100	68	55	38	156	77	76
	Female	2.88	100	67	58	39	164	73	66
<i>Neorhaphiomidas hardyi</i> sp. nov. ...	Male	2.47	100	72	49	23	189	?	59
	Female	2.35	100	70	47	24	200	11	59
<i>Neorhaphiomidas pinguis</i> sp. nov. ...	Male	1.95	100	68	47	24	155	?	49
	Female	1.93	100	70	49	28	176	?	53

The following incorporates Hardy's preliminary revision of *Apiocera* (¹) with various alterations. In particular the notation of the venation is brought into conformity with Tillyard's modification of the Comstock-Needham System.

Genus *Apiocera*, Westwood, 1835. (Text-figure 1a, Plate 1, and Plate 2, figs. a-c.)

Mostly large-headed flies with stout thorax and tapering abdomen. Antennae three-segmented with a one- or indistinctly two-segmented style. Palpi two-segmented, prominent; second segment with a pit, probably sensory in function on the outer surface. In one species herein described there is a row of three or more pits on the second segment of palpus.

Venation (Text figure 1a): Costa and R1 meet before apex of wing. Sc between them reaches to or beyond half the length of the wing. R2 + 3 terminates on R1. R4 and R5 run to edge of wing before apex, the former also sometimes ending on R1. M1 runs to margin near wing apex. M2 runs parallel to M1 reaching margin considerably behind the apex. M3 meeting M4 forms a closed cell behind the median cell before the compound vein thus formed reaches wing margin. Cu1 meets IA at or near the wing margin. Anal vein slightly sinuous, downcurving abruptly after leaving Cu at base. Cu2 weak. Certain of the veins may be weak or absent, e.g., R4, R5 or M1 in specimens of *Apiocera maritima*, Hardy.

Thorax: Scutellum well developed, its bristles strong, as are the lateral thoracics. Prothorax mostly concealed by the large head, which is fairly closely applied to thorax. Legs slender, femora not thickened.

Abdomen: Bristles poorly developed. Terminalia of male large and prominent, permanently projecting. Anal papilla elongate.

Notes:

The genus *Apiocera* shows an archaic character in the possession of a vestige of a *thyridium* at the primary dichotomy of the median vein, a feature which occurs also in other genera of Diptera, and also in Mecoptera.

Tillyard has demonstrated the presence of this structure in many fossil Mecoptera and some Trichoptera (⁴), and I am indebted to this author for pointing out to me its true nature in Apioceridae. The thyridium can be seen as a weakening or bleaching of the chitin of the median vein at the point of its dichotomy into M1 + 2 and M3 + 4.

Curran (⁶) states that short proboscis-length is a distinguishing character of genus *Apiocera*, but a species occurs in Western Australia in which the proboscis is as long in proportion as that of *Rhaphiomidas*, yet this species can in no way be considered as worthy of generic distinction. The separation made by Curran is therefore not absolutely diagnostic. The characters which should be relied on to distinguish *Apiocera* from other genera are the segmentation of the palpi and the nature of the wing venation.

Apiocera deforma sp. nov. (Plate 1, a, b.)

Male: Head: Height three-quarters of width: ground-colour black. Eyes larger than the average, separated from paired ocelli by a distance equal to the breadth of the median ocellus. Separation of eyes at vertex three-fourteenths of head-width. Paired ocelli on the sides of a prominent tubercle separated from the eyes by deep grooves which unite on the occiput

to form a V-shaped mark above the neck. Median ocellus situated in front of paired ocelli at a distance equal to twice the distance between the latter. Front depressed. Ocellar region with black tomentum and a coating of short, black, forwardly-curved hairs. These extend only a short distance in front of the ocelli where the tomentum of the front become white, and the black hairs are replaced by longer and thinner white ones, extending to near the bases of the antennae.

Antennae short, light brown in colour; basal segment with a considerable bulge on the lower surface. This segment has a slight white tomentose covering and has a coating of long soft white hairs. Diameter of second segment greater than its length; with a few white hairs similar to those of basal segment. Third segment dilated, asymmetrical in profile. Style distinct, large. Third segment longer than basal, second segment about one-third its length.

Palpi about one-half as long again as antennae, dark brown in colour. Proximal segment cylindrical with sparse covering of long white hairs below. Second segment the longer, flattened distally, narrow and pointed apically, with a few short white hairs and a row of three or four pits on the outer face.

Proboscis black, twice head length, two and a half times the length of the antennae. Folded labella pointed apically.

Posterior aspect of head with white tomentum. "Post-optic" bristles present, fairly numerous, not extending down posterior margin of eye. White hairs extend in an irregular row parallel to posterior margin of eye, not, however, extending far enough upwards to intermingle with the black bristles above. Two tufts of white hairs behind the insertions of the palpi.

Thorax: Pronotum with white hairs and spines but no black bristles above. Mesonotum black, evenly coated with short black hairs; indications of two faint wedges at anterior end. A white band round the margin as in other species, extending onto sides of scutellum. Pleura dark brown with white tomentum and black and white hairs irregularly scattered.

Legs brown, coxae with white hairs, but devoid of black bristles.

Wings evenly tinted pale brown.

Abdomen stout, ground colour brownish-black. Basal segment with white tomentum and white hairs. A white band on posterior margin of second, third and fourth tergites, extending at sides on to succeeding tergites. Fifth segment almost all white. Following this the sclerites are mainly brownish-black. Venter mostly with white tomentum, but in large patches the brown ground colour is visible.

Terminalia very prominent and swollen. Superior edge of upper forceps with an apex near posterior end. Lower forceps considerably shorter than upper, blunt. Ninth sternite almost as long as lower forceps. Proc-tiger projecting behind teeth of upper forceps; lateral lamellae narrow, down-curved at tips, lower lamella broad, with a corresponding curve. Tip of upper forceps has soft white hairs but remainder of terminalia more or less densely covered with a coating of black bristles. Claspers unique, being in the form of broad, poorly chitinised plates, light brown in colour tapering rather abruptly distally, and with a slight pubescence.

Female: No female is available for description, but it should, however, be readily recognised by head characters and tinting of wings.

Measurements: Male, body 20 mm. (not including head), Wing 12 mm.

Hab.: Gnangara, W.A., 2 males, O'Connor, December.
Swan River, W.A., 1 male, L. J. Newman.

Notes: The large bulbous genitalia and multiple palpal pits are unique features among local species.

***Apiocera pica* sp. nov.** (Plate 1, c, d, Plate 2, a.)

A large stout fly. Body comparatively short in proportion to width.

Male: Head large, about as wide as thorax and covered with a white tomentum. Eyes large, separated at vertex by one-fifth of the head-width. Height of ocellar triangle about two and a half times the base. Ocellar tubercle thickly clothed with long wavy dark brown hairs which extend in two parallel rows to near the bases of the antennae where they are replaced by white hairs.

Antennae fairly short, basal segment stout, brown, with white tomentum; a strong bulge on the lower surface near the distal end; vestiture consisting of a number of black bristles and a few white hairs. Second segment brown, tomentum white; a whorl of about a dozen black bristles round its middle. Terminal segment black dusted with white, particularly proximally; symmetrical in profile. Style distinct, black.

Palpi longer than antennae, basal segment cylindrical, dark brown in colour; with a few long white hairs below and one or two black bristles. Second segment broad and flattened distally, lighter in colour; truncate apex slightly incised, also with sparse white hairs and one or two black bristles. Palpal pit prominent.

Face very narrow, as antennae are situated close to epistome. The latter has a small fringe of short white hairs.

Proboscis black, folded labella rounded apically and considerably broader than proboscis in profile.

"Post-optic" bristles well developed, not extending far down posterior margin of eye. These spines are intermingled with white, radially directed hairs which are continued down the sides behind the eyes as a fringe resembling an Elizabethan ruff in appearance. Head capsule, the ground colour of which is black, is thickly beset at base of proboscis and below neck with long white hair.

Proboscis twice the length of antennae, about two and a quarter times the length of head.

Thorax: Pronotum with black bristles and white hairs above. Ground colour of mesonotum black. A band of white pulverulence round periphery, not extending onto scutellum. Anteriorly a median white stripe extends back to about the level of the suture. On either side of this is a more prominent white stripe, broadening anteriorly, where each curves outwards. These also extend to about the level of the suture. Along the line of the suture a white wedge points inward from the marginal band. From the latter two other white wedges arise on each side, one behind and one in front of the suture, curving respectively forwards and backwards to touch the sutural mark between its apex. These three wedge-shaped marks on either side run into the paired longitudinal stripes near the hinder end of the latter.

A pair of broad white bars is situated in front of the scutellum and behind the terminations of the vittae; from each of these marks a thin white line extends outwards and forwards to meet the apex of the sutural wedge. A small median white spot is situated in front of the scutellum. The latter is black and has a fringe of white hairs. Areas between the white marks are brownish to blackish in colour. The whole of the mesonotum, excepting the space occupied by the white fringe on scutellum, is beset with a thick coating of brown hairs. Post-alar callus with a dense tuft of white hairs.

Pleura dark brown, with a white tomentum and a dense coating of white hairs which are also particularly abundant on prosternum. Pteropleuron with a patch of black hairs.

Legs long, brown; but so densely black-haired as to appear black. Coxae with white hairs, white tomentum and some black bristles.

Wings hyaline, normal.

Abdomen: Marked with black and white pattern. Ground colour dark brown. Basal tergite mostly sooty black but laterally white and with two white spots posteriorly. The second tergite bears the largest dorsal white markings in the form of two broad, transverse white strips. These marks are separated by a median black band and this broadens over the anterior half of the tergite and laterally sweeps back to the posterior corner of the tergite. Anterior corners white. Third tergite mostly black; two white marks posteriorly, and antero-lateral corners white. Fifth tergite mostly white; black central stripe and posterior edge. Remaining tergites black or brownish. Venter white. Abdomen covered with short black bristles. Basal tergite with dense white hairs and two lateral patches of black hairs. One or two following tergites and the anterior sternites have a few white hairs.

Terminalia dark brown with a thin coating of white tomentum and with a covering of short black bristles. The terminalia of this fly are of a non-descript type which is found in the majority of species and shows no very definite external differences for specific diagnosis. The whole terminalia in the resting condition fit closely together like a box, leaving only a small opening on the dorsum, where the proctiger protrudes. The clasper is distinctive (Plate 2, a).

Female: Similar to male, except that the eyes are more widely separated, being one-third of the head-width apart.

Measurements: Male, body 18.5 mm., wing 14 mm.

Female, body 18.5 mm., wing 14 mm.

Hab.: Gwangara, W.A., 1 male November, 1930; 2 females December, 1930, Perry.

Gwangara, W.A., November, 1930, 2 males, 1 female, O'Connor. 2 females, 1 male unlabelled.

Notes: Among the specimens studied there is a smaller fly which apart from a number of minor characters differs from the above species in abdominal pattern. Probably its true relationship could be best expressed by describing it as a subspecies; but this will not be attempted until a larger number of better preserved specimens are available for study.

***Apiccera tonnoiri* sp. nov.** (Plate 1.e, f. Plate 2, b.)

A large elongated species very distinctive in character of proboscis.

Male: Head very concave posteriorly. Front depressed. Face not projecting. Head-height about nine-elevenths of width. Eyes large, separated at vertex by only the twenty-second part of head width. A very deep narrow

groove runs between eyes at vertex behind ocelli, and continues out on to occiput to run in a much shallower form into cervicium. Ocelli crowded forward from normal position. Paired ocelli practically touching eyes, and elongated in a vertical direction. Median ocellus larger, transversely oval, well separated from others. Ocellar tubercle and front with long black hairs. Face and oral margins with white tomentum.

Antennae situated almost on epistome. Basal segment light brown, very convex ventro-laterally; with white tomentum and long, black and white hairs. Second segment brown, shorter than broad, dusted with white and with long black bristles round middle. Third segment light brown, darker distally; with faint white dusting. This segment is slightly longer than the first. Style black.

Palpi honey-coloured, both segments darker at base. Proximal segment the longer, cylindrical, dusted with white, and with white hairs. Distal segment shaped like a quart of an orange, dusted with white and with a coating of long white hairs, and one or two black ones. Pit prominent, situated slightly nearer to base than to apex.

Proboscis brown with very characteristic labella slightly less than one and a half times the length of the head capsule. Occiput with dense white tomentum, a ruff of short white hairs, and a small tuft of black bristles behind each eye apex. Hairs round edge of oral cavity white, extremely short. All white hairs round edge of occiput and near bases of palpi are exceptionally short.

Thorax dark brown, entirely pollenose. Pronotum white pollenose, with white hairs and a circle of black bristles. Mesonotum with a slender median stripe, dirty-white in colour. A pair of stripes flanking this, broadening anteriorly. Humeral callus and a lateral longitudinal strip behind this white. Lateral and scutellar bristles black. Rest of dorsum with a sooty-brown pollen. Dorsum of thorax with a dense coating of short dark brown hairs. A patch of white hairs on post-alar callus and above wing-base. Scutellum with a sparse coat of white hairs which extend beyond its limits on to posterior part of scutum. Post-scutellum white pollenose. Pleurae brown, entirely covered with white tomentum; in patches with very short black hairs.

Wings hyaline, veins black.

Legs light brown, tomentum white, but sparser distally. Bristles black. Soft white hairs on coxae and bases of femora.

Abdomen long and tapering. Ground colour brown. Basal tergites with a sooty coloured pollen, except at lateral margins, which are white; with a dense coat of fine white hairs, and, on basal tergite, a few black ones. The four last tergites lack this hairy covering. Sternites with sparse white tomentum and white hairs.

Terminalia dusted with white. Proctiger with lamellae separated at tips. A dense beard of long white bristles closes genital cavity from below. Eighth sternite very prominent, whilst ninth sternite which bears the abovementioned beard is in the form of a truncate plate. Clasper, Plate 2, b.

Female: very similar to male but eyes more widely separated at vertex, i.e. by two-ninths of head width. Distance between each lateral ocellus and eye is equal to that between the members of the pair. On account of genitalia, abdomen appears shorter.

Measurements: Male, body 20 mm., wing 13mm. Female, body 18½mm., wing 14mm.

Hab.: Applecross (about five miles east of Fremantle) 12 males, 10 females. February 1935, December 1935, February 1936. K. R. Norris.

The Writer has taken this species at only one locality. The flies occurred round bushes of the Proteaceous plant *Adenanthos cygnorum*. For the most part they rested on the loose sand, but occasionally specimens were seen flying and climbing in the branches of the abovementioned shrub, the extrafloral nectaries of which are, no doubt, the attractive agent. In flight the sound produced resembles that of a large blowfly.

Although within a few paces there were abundant flowering shrubs of pink myrtle (*Hypocalymma robusta*) the flies were never on any occasion observed to visit it although dozens of species of Diptera and other insects were taken on this plant, including a species of **Neorhaphiomidas** gen. nov.

Notes: The proboscis has quite an exceptional structure in the nature of the labella (see Plate 1, f). In preparations of the proboscis and occasionally in dried specimens the pseudotracheal membrane protrudes below the labella, hanging down in the form of a soft, tongue-like, pointed lobe.

Apiocera pallida sp. nov. (Plate 1, j; Plate 2, c.)

A hairy species which is a parallel to *Apiocera maritima*, Hardy, being predominantly white in colour and occurring on white sand dunes and adjacent sandy regions.

Male: Head: Ground colour, black, but completely obscured by dense white pulverulence. Eyes separated at vertex by about two-sevenths of head-width. Inner margins of eyes fairly straight, diverging out at base of head. Ocellar region with light brown hairs projecting up from the white tomentum. Lateral ocelli well separated from eye. Height of ocellar triangle about one and a half times the base. Below ocellar region the hairs are white, extending round oral rim to join the hairs on the back of the head.

Antennae: Basal segment brown, covered with white tomentum, armed distally with long pale bristles, proximally with soft white hairs. Second segment black, globular, with white tomentum and a circle of pale spines. Third segment yellow at base, black distally, with a patchy white pollen. Style black. Basal and distal segments equal in length.

Palpi equal in length to antennae, basal segment cylindrical, ground colour yellowish-grey; with loose white tomentum and with a sparse coat of long white hairs. Distal segment more or less truncate apically; with white tomentum and a few white hairs.

Proboscis black, about one and two-thirds as long as head capsule and in a similar proportion to length of antennae.

Height of head two-thirds of width, and width two and one-third times length.

A groove marks off face and genae from rim-like edge of oral cavity.

Back of head with white tomentum and a dense ruff of radially-arranged hairs extending down to bases of palpi. Behind each eye apex is a tuft of yellowish bristles. No black bristles at all upon head.

Thorax vittate above. Ground colour blackish. Pronotum white, with white hairs and only white spines above. A median white stripe is present on mesonotum, which fades out before the scutellum. This stripe is flanked by a pair of broader black ones, and these in turn by a white pair which

diverge and broaden anteriorly. Humeral calli white. A white patch just above wing-base; another but larger between humeral callus and suture, this latter mark being in the form of an inwardly pointing wedge. Scutellum black. Post-scutellum with white pollen. Ventral and pleural regions with very dark ground colour obscured by dense coating of white pulverulence and white hairs. A tuft of black bristles on humeral callus, lateral thoracics mostly black; a few, however, are pale and yellow. Post-alar callus with a tuft of long bristles, about one-half of which are pale. Scutellar bristles black. Dorsum of thorax with an even coating of short, erect, brown hairs. In front of and on scutellum these become white and longer. There is a few white hairs at anterior of mesonotum as well.

Legs: Coxae and femora yellowish, with white pulverulence and white hair; bristles pale. Tibiae and tarsi yellow, the former with white pollen; bristles yellow proximally, black on terminal leg segments.

Wings hyaline, costa pale, median vein black, remainder brown. Median thyridium particularly obvious. Squamae with dense white fringe. M1 and M2 very weak and pale. Free part of M3 + 4 short or absent. Halteres yellowish-brown.

Abdomen short; tergites black, brown laterally. Sternites brown. Tergites edged with white posteriorly. Fourth and fifth tergites with paired white patches above. Those parts of the tergites visible from the sides are mostly white, but tergites two, three and four have brown lateral patches. The four basal tergites have dense white hairs above. Segment five is partly so; but hair of remainder of dorsum is black. Venter entirely with white pollen and white hairs which are longer at the base.

Terminalia brown, with dense white tomentum and white hairs. Similar to those of *A. pica* sp. nov. in shape.

Female: Front wider than in male, occupying two-fifths of the head-width. Abdomen not nearly so hairy dorsally and differing in dorsal pattern. There is a slender, brown, median stripe, and broad paired lateral brown spots on tergites 2-5.

Measurements: Male, body 16 mm., wing 10 mm. Female, body 16 mm., wing 11mm.

Hab.: Garden Island, W.A., 1 female, 11th March, 1933, 1 male 23rd February, 1935, K. R. Norris. Carnac Island, 18 males, 4 females, 2nd February, 1936, K. R. Norris.

Mr. L. Glauert has shown me a specimen collected at Cottesloe on the mainland.

Notes: The first specimen taken was the female from Garden Island. It was perching on a bush on a cliff above the sea. The male from Garden Island was taken on a sand-dune, where other specimens were also seen in a growth of *Calocephalus browni*. On Carnac Island the species was extremely common, but males were preponderant. Three of the females were evidently recently emerged and were very sluggish, but the males were agile and pugnacious, continually indulging in aerial duels with one another. They occurred on the loose white dunes and beach sand, and also on the more compact earth away from the shore. One female was removed from the possession of a small female Asilid of genus *Cerdistus*. The males may be as small as 13 mm. in length.

Apiocera minor sp. nov. (Plate 1, g, h, Plate 2, d.)

Male: Head-height seven-tenths of width. Eyes widely separated, being three-eighths of the head-width apart at vertex. Inner margins of eyes are parallel. Separation of eyes at vertex is three times the width of ocellar tubercle. Paired ocelli separated from eye margin by a distance which is greater than the distance between them. Ocellar triangle equilateral. Head-capsule black, completely covered with white tomentum. Front and ocelli sparsely covered with long brown hairs, absent from a median region above the antennae, where the tomentum is brown.

Antennae black, long and slender. Basal segment dusted white; when viewed from above with a straight inner margin and a strongly convex outer margin; with a few long black spines, and on the outer face white hairs. Second segment globular, dusted white; a few long black spines in a whorl round its middle. Terminal segment black, cigar-shaped, dusted silvery white; apt to crumple in dried specimens. The third segment is about one-third as long again as is the basal, whilst the black bristles with which the antennae are armed are about equal in length to that of the basal segment. Style prominent.

Face of considerable breadth. Genae with a fringe of white hairs.

Palpi slightly more than three-quarters of the antennal length, basal segment cylindrical, light brown with numerous long white hairs below; equal in length to two-thirds that of the distal segment. Terminal segment cylindrical at base, flattened distally, rounded apically, light brown in colour but darker distally; thin black bristles near upper margin and soft white hairs below.

Proboscis slender, black, twice as long as head; folded labella smoothly angulated apically, distinctly broader than proboscis in profile.

Epistome almost squarely transverse. Face and genae with soft white hairs. Posterior aspect of head with long white hairs and a fairly large tuft of black spines behind the apex of each eye intermingled with white hairs. The hairs near the insertion of the palpi and on the basal segment of these appendages are particularly long.

Thorax: Ground colour black. Pronotum with black spines and white hairs above. Mesonotum with a greyish dust and a pattern of greyish white marks, corresponding roughly in distribution to those of *A. pica* sp. nov. Humeral callus with a tuft of short black bristles. Lateral thoracics and scutellars are extremely long. Pleurae covered with white tomentum and white hairs. A tuft of black bristles above anterior coxae. Mesonotum with an even coating of short brown hairs; those of scutellum white.

Legs brown, long; coxae with white hairs and tomentum and white bristles.

Wings hyaline, normal. Halteres brown.

Abdomen: Ground colour, brown. Basal tergite with a pair of white stripes corresponding with lateral edges of scutellum. Second tergite with a pair of similar white stripes posteriorly, half the length of the tergite. The pattern on the third and fourth tergites can perhaps best be described as a black broad arrow on each, pointing forwards; remainder white. Remainder of tergites with white tomentum and a median black stripe. Sternites with white tomentum and anteriorly, white hairs. Basal tergite with a few white hairs, and on either side posteriorly a tuft of black bristles.

Terminalia covered with black bristles, clasper bearing a few black spines below.

Female: Larger than male, front not broader, most readily distinguished from male by the terminalia.

Measurements: Male, body 12.5 mm., wing 7.5 mm.

Female, body 12.5 mm., wing 8 mm.

Width of thorax in both sexes 3 mm.

Hab.: Carlisle, W.A., 2 females, 1 male, D. Swan.

Mullewa, W.A., 1 female, 1 male, L. J. Newman.

Gnangara, W.A., 1 female, November, 1930, O'Connor.

Yelbeni, W.A., 1 female, September, O'Connor.

Kalgoorlie, W.A., 1 female, September, L. J. Newman.

Notes: Closely allied to *A. newmani* sp. nov., but distinguished by the much shorter proboscis, larger labella and less prominent face. There is also a pronounced difference in the flange bordering the gena laterally, as will be seen from the illustrations. The Mullewa, Yelbeni, and Kalgoorlie specimens are smaller and duller than the others.

***Apiocera newmani* sp. nov.** (Plate 1, i, Plate 2, e.)

Male: Head about seven-tenths as high as wide. Eyes widely separated by slightly more than one-third of head-width, inner margins parallel. Head capsule black, completely covered with white tomentum except above antennal bases where there is a brown streak. Ocelli widely separated from eye and arranged almost in the form of an equilateral triangle. Median ocellus larger than others. Long, curling brown hairs extend from behind ocelli to the bases of the antennae, but are absent from the brown streak above-mentioned.

Antennae very long and slender, black. Basal segment dusted white, unusually obliquely truncate distally when viewed from above, and concave on the inner surface; with long black bristles and proximally a few white hairs. Second segment globular, with white dusting and a whorl of about five long black bristles. Terminal segment cylindrical, with a silvery white dusting; style very short and blunt. The third segment crumples up on drying, and is longer than the basal. Antennae inserted a fair distance from epistome which forms a distinct apex below antennae.

Face very prominent. A fringe of white hairs round genae, partly concealing a prominent brown flange which projects and borders the epistome on either side.

Palpi slightly longer than antennae; light brown in colour; basal segment roughly cylindrical, with a few long white hairs. Second segment flattened distally, smoothly rounded at apex, with a few long white hairs proximally; most of the outer surface sparsely covered with black hairs. Pit small.

Proboscis black, very attenuated, labella very small, scarcely broader than body of proboscis in profile.

"Post-optic" bristles present in a tuft behind upper angle of eye; and extending in a row about half-way down the posterior margin of eye. Intermingled with these bristles are white hairs directed like the bristles radially outwards. On the lower aspect of the head capsule behind the eyes

these white hairs become continuous with the fringe previously mentioned as running round the genae, and together with two long tufts from near the bases of the palpi hang down to form a long beard. Proboscis twice the length of antennae and three times the length of the head-capsule.

Thorax: Prothorax with black spines and white hairs above. Mesonotum black with three white stripes, the median of which is very slender, and separated from the broader, lateral pair by broad black bands. A white band continuous round edge of mesonotum, including scutellum. Mesonotum with a thin covering of fine brown hairs. Humeral callus with a tuft of short bristles. Lateral thoracic and scutellar bristles very long. Pleura black with white tomentum and a few white hairs, especially below wing and also above anterior coxae, where there is also a tuft of black bristles, though these may be white.

Legs brown, coxae with white tomentum and hairs, and white bristles.

Wings rather small hyaline, free, part of M3 + 4 may be absent. Halteres brown.

Abdomen: Ground colour brown, darker at bases of segments. The four basal segments with paired white stripes above, separated by a continuous median black stripe. The white stripes may not extend over the anterior half of the tergites. The basal tergites are white laterally. Sternites of anterior region with white tomentum and a few white hairs. Basal tergite with white hairs and paired lateral tufts of black bristles. Distal segments and terminalia brownish black, with black bristles. Shape of terminalia similar to that in *A. minor* n. sp., but clasper differs in having no stout black spines ventrally.

Female: Larger than the male. Front of same width.

Measurements: Male, body 12 mm., wing 7 mm.

Female, body 13 mm., wing 8 mm.

Width of male thorax 2½ mm., of female thorax 3 m.

Hab.: Gnangara, W.A., 2 females, 1 male, November, 1930, O'Connor.

Gnangara, W.A., 2 females, November, 1930, Perry.

King's Park, Perth, W.A., 4 males, 1 female, November, December, 1935, K. R. Norris.

Notes: The small labella, great length of proboscis, antennae and palpi and in general the slender build distinguishes this species. The fact that the upper margin of the epistome comes to an apex is also rather a peculiarity.

The specimens taken in King's Park were found sitting in open grassy, but not sandy spaces between knee-high clumps of vegetation. They were for the most part around flowering clumps of *Hemiandra pungens* and one specimen was observed to traverse a broad stretch of this plant with abundant flowers, alighting here and there to disappear into the depths of a flower for a moment. This is the only occasion on which the writer has observed an *Apiocera* visiting a flower.

This undoubted species of *Apiocera* proves that proboscis-length is no certain character in diagnosis of genera, for specimens with extreme extension of proboscis may show the overall length of this organ to be between three and four times the head-length. This may well equal or exceed the proboscis-length of the genera other than *Apiocera*.

This species is named in honour of Mr. L. J. Newman, Government Entomologist, W.A.

NEORHAPHIOMIDAS gen. nov.

(Text-figure 1, b. Plate 2, f-j.)

Related to *Rhaphiomidas* Osten Sacken; but distinguished by specialisation of wing venation. Thinly pilose but bristleless flies.

Head fairly small. Eyes large. Anterior ocellus separated from the other two by a considerable distance, and larger than them. Antennae three-segmented, style minute, subapical. Palpi very short, composed of a single segment. Proboscis long and poorly chitinised.

Prothorax, which forms a neck between head and thorax, has a circle of bristles above. Thorax otherwise devoid of bristles. Scutellum reduced. A prominent nodule in front of halter.

Wing venation. (Text fig. 1, b.): Differs from that of other genera of the family in the fusion distally of the median and radial veins. R2+3 and R4 ending on R1. R5 and M1 fusing a short distance after the origin of the latter. M2 curves up and fuses with this compound vein to make a vein of triple origin, R5+M1+M2 which also ends on R1, just at the point of juncture of the latter with the wing margin, well before wing-apex. Free distal part of M3+4 may be absent. Cu1 meets 1A just before wing margin.

Legs long and fairly strong, empodium absent. Hind legs longer than others and hind femora more or less clubbed.

Abdomen shiny. In females broader than thorax at its widest part; slightly curved ventrally. Females with spines of acanthophorites readily visible. Males with upper and lower forceps developed, but rather small and retracted into the terminal abdominal segments so that only the tips protrude. Anal papilla very broad and short.

Genotype. *Neorhaphiomidas hardyi* sp. nov.

Notes: Osten Sacken remarked that the nodule in front of the halter in *Rhaphiomidas* had no parallel in his knowledge, but it is probably only an overdevelopment of a similarly-placed bulge which can be seen in *Apiocera*, but which does not catch the eye as it does in the other genera. In *Neorhaphiomidas pinguis* sp. nov. described in this paper an intermediate stage can be seen, because in this species the bulge in front of the halter is simple and rounded, and lacks the conical tip found in *Rhaphiomidas* and *N. hardyi* sp. nov.

That the interpretation of vein labelled M2 is correct and that it is not M3+4 can be seen from a female of an undescribed species presented to me by Mr. D. C. Swan. In this specimen vein M3+4 is present, in addition to M2, as a small vein running out to wing margin.

Neorhaphiomidas hardyi sp. nov. (Text figure 1, b. Plate 2, g-j.)

Male: Head small. Head-capsule black, covered with greyish-white tomentum. At vertex, eyes are separated by about two-ninths of head-width. Height of head three-quarters of width. Paired ocelli situated on the sides of a prominent tubercle, separated from the eye by one-half the distance between the ocelli. Median ocellus large and depressed, situated almost half-way between paired ocelli and the bases of the antennae. Ocellar tubercle black, with short black hairs which extend in a row down either side of the front to join a patch of white hairs above the base of each antenna. A slight notch in the inner margin of each eye opposite the bases of the antennae.

Antennae black, faintly white-dusted. Basal segment cylindrical, with a dense coating of black bristles. Second segment globular, shiny, with black

hairs similar to proximal segment. Third segment the longest, with a few very small black hairs; broadest at middle, tapering somewhat abruptly distad to this; apex rounded in profile. There is a concavity on the outer surface of the tip which contains a minute style projecting forwards from its posterior face.

Antennae situated practically on epistome, which is rounded at apex. Below the base of each antenna is a small tuft of whitish hairs on the face. A bare, brown flange borders the genae on either side.

Proboscis black, long, about four times the head-length when an overall measurement is made; labella long but not prominent.

Palpi black, very small and composed of a single segment; with a few yellowish hairs.

Back of head with white tomentum. An irregular line of thin black bristles from the upper corner of the eye to about half-way down posterior border: these spines are separated from the actual margin of the eye by a space. Intermingled with these and more widely scattered are a few soft white hairs which continue to near the base of the proboscis, where they are much denser.

Thorax very deep brown in colour. Pronotum plainly visible, as the head is widely separated from the mesothorax. It has a circlet of black bristles above, intermingling with softer hairs. Mesonotum with a coating of very short brown hairs. Two wedge-shaped marks of pale dusting at the anterior end of mesonotum. A small pale patch also appears above the base of each wing. Scutellum small, shiny, with a few soft white hairs; devoid of bristles which are also absent from the remainder of mesothorax. Post-scutellum with greyish-white dust and white hairs. Anterior spiracle encroaching upon lower half of humeral callus. Pleura dusted with white and with a few white hairs. The most exceptional feature of the pleuron, as noted by Osten Sacken is a nodule arising just in front of the halter. This nodule consists of a rounded base with a prominent nipple arising from it and projecting backwards. The whole structure has a few white hairs. Prosternum large with fairly dense long white hairs.

Wings suffused with greyish-brown. Distally and posteriorly the general wing-colour is considerably lighter, the courses of the veins being marked by narrow bands of darker colour.

Venation (Text-figure 1b): Sub-costa ends on costa at about two-thirds wing length. R1 continues well out towards tip of wing, parallel with costa in its distal third. R2 + 3 simple, ending on R1. R4 ending on R1 a short distance after termination of R2 + 3. R5 turns down to fuse with M1, the resultant compound vein turning up to end on R1, after meeting M2. M2 arises with M3 from the median cell by a common stem, separating a short distance from the median cell to curve right up and fuse with R5 + M1 just before these join R1, which ends at this point on the costa by turning abruptly outwards. M3 and M4 form a complete cell with evenly curved boundary, the free portion of M3 + 4 being absent. Cu1 and 1A meet a short distance from the wing margin. The anal vein after leaving Cu at base, not abruptly down curved.

Knob of halter very large and white, stem brown.

Legs dark brown, bristles weak, hind femora thickened. Coxae with white hairs. Hind legs longer than body.

Abdomen stout, not tapering so much distally as in *Apiocera*. Segments 2-5 all of same width. Basal tergite reduced. Dusted greyish; but anterior edge shiny. Remaining tergites shiny, of a deep brown colour. Posterior edge of tergites 3-6 with a thin white band on either side. Sternites evenly tinted lighter brown, with scattered golden hairs.

Terminalia, and terminal segments rather hairy. The terminal organs are rather small and insignificant, quite unlike the average species of *Apiocera*, and partly retracted into the terminal segments of the abdomen. The anal papilla is very broad and flattened; upper lamellae rounded apically. The forceps, particularly the upper are reduced, whilst the aedeagus is roughly cylindrical and upwardly curved. Claspers absent; ninth sternite deeply cleft in median line. Bristles of genitalia small and black.

Female: Abdomen broader than in male, having its widest point at the third and fourth segments. The head is slightly smaller than in the male.

Measurements: Male, body 12mm., wing 9 mm. Female, body 12½ mm., wing 10 mm.

Hab.: Swan River, W.A., 1 male. L. J. Newman. Subiaco, W.A., 1 male, December. L. J. Newman. Swan River, W.A., 1 female, December, 1931. L. J. Newman. Applecross, W.A., 3 males, 9th February, 1936; 1 female, 9th February, 1935, and 3 females, 28th January, 1935. K. R. Norris.

Notes: The vestiture shows some variation in quantity. Ground colour and wing-colour may also be of a lighter brown.

The flies collected by the writer were taken at Applecross, about five miles east of Fremantle. They were feeding on flowers of *Hypocalymma robusta*, and proved to be rather sluggish and more easily caught than any species of *Apiocera*. They were not observed ever to rest upon the sand.

It seems probable that this fly is a general mimic of certain small Psammocharid and Sphecoid wasps which are very abundant in the neighbourhood, visiting the above-named plant. The morphological modifications contributing to the deception are found in the shiny dark integument, the very long legs, the pale lunules on the abdomen, and the darkening of the wings; but these characters would not be very effective if it were not for the habit which the flies have of rapidly flicking the wings whilst investigating the flowers, in exactly the same way as do the small striped Psammocharids of the area. A very close inspection is necessary whilst the insect is still on the flower to ascertain its true nature.

***Neorhaphiomidas pinguis* sp. nov. (Plate 2, f.)**

A small plump species, which is certainly the most diminutive Apiocerid hitherto described.

Male: Head rather similar in appearance to that of *N. hardyi* sp. nov. Ground colour black but covered with a greyish-white tomentum. Eyes separated at vertex by one-quarter of the head-width. Head-height about three-quarters of breadth. Ocellar tubercle, large, mostly black, surrounded by grooves bearing lateral ocelli on its edges, slightly behind highest point. Median ocellus large and transversely elongate, not situated on tubercle but just in front of it, in a black, shining depression. Ocellar tubercle with very long, erect, kinky black hairs. A few short white hairs just above antennae.

Antennae black, basal segment with straight, parallel edges. Second segment broader than the first, and shorter than wide. First and second segments with long black hairs; first with a few white hairs also. Third segment the longest, fusiform, with patches of faint white dusting.

Face and lateral margins of oral cavity with long wavy white hair. Epistome comes to a point a short distance below antennae, and is not transverse.

Palpi very small, black.

Overall length of proboscis about three and a half times the length of the head and about three times the length of the antennae.

Posterior aspect of head with white tomentum and a coat of long thin erect white hairs. These are especially dense and wavy near the base of the head. The black bristles normally present behind the apex of the eye in Apioceridae are few in number and reduced almost to the form of hairs, being very slender.

Thorax: Ground colour deep brown. Prothorax thinly dusted with white, covered with white hairs and lacking black spines above. Humeral calli prominent, greyish-white bearing a shining brown ridge above spiracle. Mesonotum with a broad central dark brown stripe, which is bordered on either side by a narrow greyish-white stripe broadening anteriorly. A dark brown stripe runs from humeral callus to scutellum, whilst laterally the mesonotum has a greyish-white edge, equal in width to the latter. Post-alar callus brown, shining. Scutellum and post-scutellum dark brown, dusted with white. Dorsum of thorax beset with a fairly dense coat of thin, black, wavy hair. Above wing-bases, on humeral callus, post-alar callus and on scutellum is a few pale hairs.

Pleura brown, with white tomentose covering and a coating of long wavy white hairs. The knob which projects in front of base of halter differs from that of *N. hardyi* sp. nov. in shape, being smoothly rounded and lacking the pointed tip. It is covered with white tomentum, and very long, wavy white hairs.

Sterna brown, with white tomentum and, except for mesosternum, white hairs.

Legs dark brown, with white hairs and weak bristles. Coxae, trochanters and femora with white hairs. Posterior femora clubbed, with four stout, black, erect spines on under side at distal end.

Wings hyaline, with a milky sheen. Veins yellowish-brown, venation exactly like that of *N. hardyi* sp. nov. No trace of M3 + 4 present. Anal lobe small, alula absent, squame very small.

Abdomen shining, broader than thorax, especially at widest part; this, which is also the thickest part, occurs at segments four and five. Rest of abdomen not so thick, and bent down at tip. Ground colour of abdomen mostly dark brown; but segments 3-8 have each a pair of creamy-white, half-moon shaped marks at the posterior edges of the tergites, whilst sternites 3-8 have a similarly coloured hind border. Basal tergite raised, differing from others in being greyish-white dusted. Hairs of abdomen black and small mid-dorsally but white and soft laterally, ventrally, and on first tergite.

Terminalia (Plate 2, f). Anal papilla very broad, similar to that of *N. hardyi* sp. nov. Ventral forceps broader than in the latter species, and excised apically. Ninth sternite and aedeagus rather similar to those of

N. hardyi but this species differs considerably from the latter in the possession of a pair of elaspers, in the form of simple, inward and downwardly curving hooks. All the parts of the terminalia are shiny, translucent and brown, the bristles being small and black.

Female similar to male except that abdomen is broader.

Measurements: Male, body 7 mm., wing 5 mm.

Female, body 7 mm., wing 5 mm.

Hab.: 1 male, Rottnest Island, W.A., 23rd February, 1936.

1 female, Garden Island, W.A., 23rd February, 1935.

Both collected by the Writer.

Notes: The female taken on Garden Island was perching on a dead exposed root on the top of a very high sand dune. In the absence of a net, the insect was captured by hand, this proving an easy matter as it was extremely sluggish and still. It is a rather rubbed specimen with the posterior tibiae broken off.

The male taken on Rottnest Island was flying actively over a clump of *Conostylis candicans*, visiting the dead flowers.

ACKNOWLEDGMENTS.

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His thanks are also due to Mr. A. Tonnoir for help with literature not available in Western Australia, and to Mr. L. J. Newman, Government Entomologist, W.A., for the loan of specimens.

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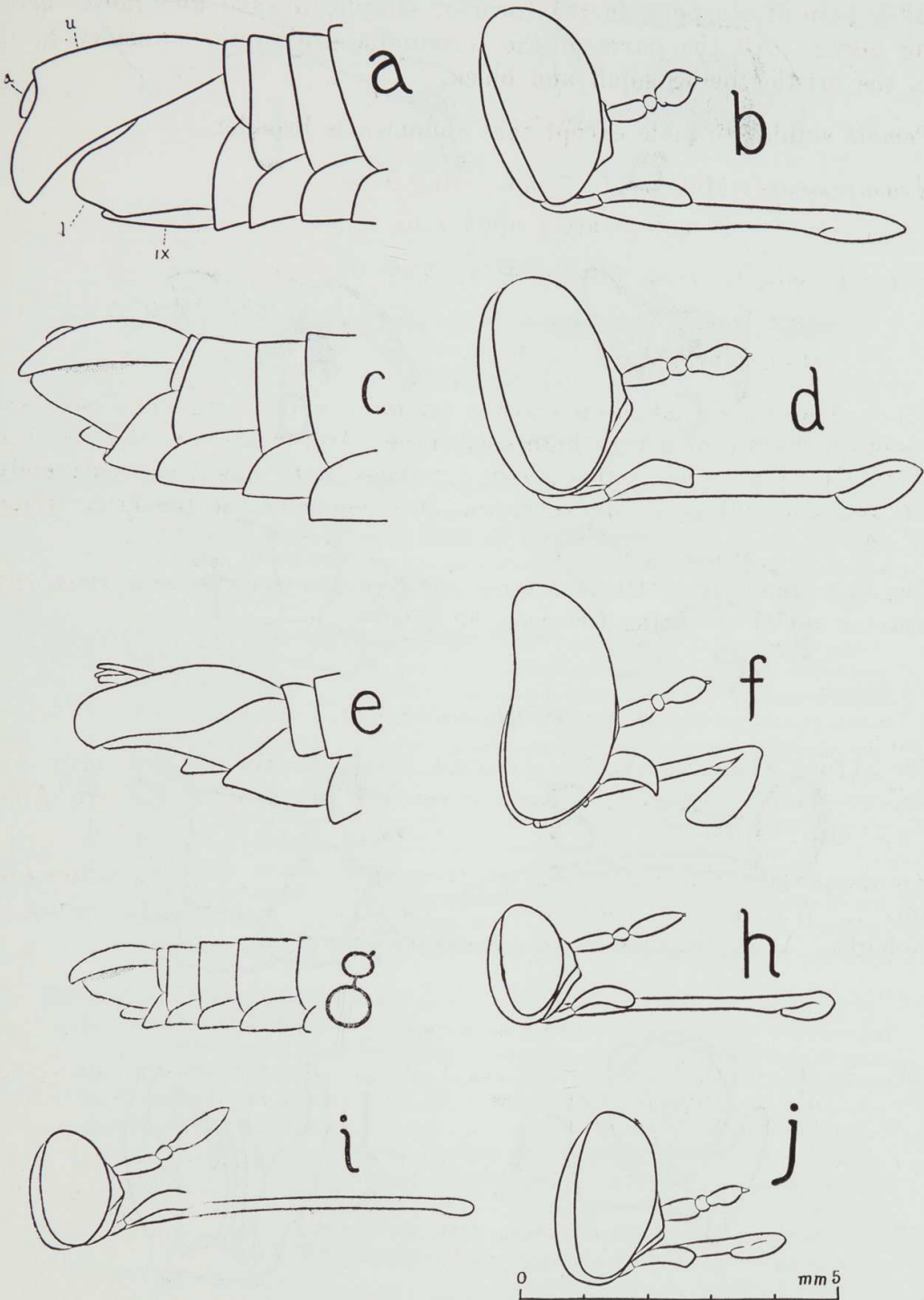


PLATE I.

- a. *Apiocera deforma* sp. nov., Terminalia of male.
 b. *Apiocera deforma* sp. nov., Head.
 c. *Apiocera pica* sp. nov., Terminalia of male.
 d. *Apiocera pica* sp. nov., Head.
 e. *Apiocera tonnoiri* sp. nov., Terminalia of male.
 f. *Apiocera tonnoiri* sp. nov., Head.
 g. *Apiocera minor* sp. nov., Terminalia of male.
 h. *Apiocera minor* sp. nov., Head.
 i. *Apiocera newmani* sp. nov., Head.
 j. *Apiocera pallida* sp. nov., Head.

(u—upper forceps, a—anal papilla, l—lower forceps, IX—ninth sternite.)

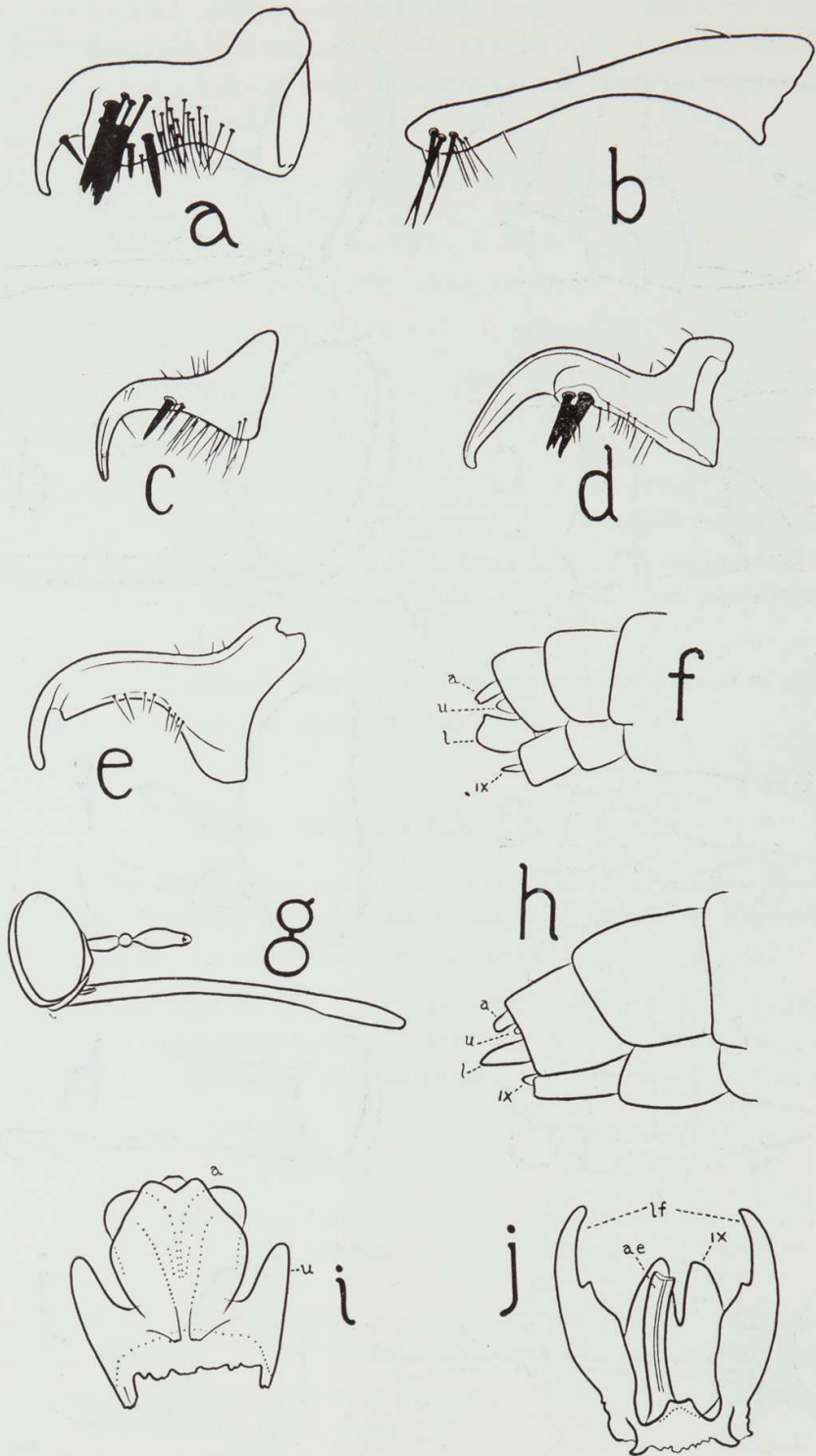


PLATE II.

(Figure g to same scale as preceding plate ; Figs. i, j, and a-e, 5 times this magnification ; Figs. f and h, $2\frac{1}{2}$ times.)

- a. *Apiocera pica* sp. nov., Clasper.
- b. *Apiocera tonnoiri* sp. nov., Clasper.
- c. *Apiocera pallida* sp. nov., Clasper.
- d. *Apiocera minor* sp. nov., Clasper.
- e. *Apiocera newmani* sp. nov., Clasper.
- f. *Neorhaphiomidas pinguis* gen. nov., sp. nov., Male terminalia.
- g. *Neorhaphiomidas hardyi* gen. nov., sp. nov., Head.
- h. *N. hardyi* sp. nov., Male terminalia.
- i. *N. hardyi* sp. nov., Anal papilla and upper forceps dissected out.
- j. *N. hardyi* sp. nov., Lower forceps, aedeagus and ninth sternite dissected out.

(a—anal papilla ; ae—aedeagus ; l, lf—lower forceps ; u—upper forceps ; ix—ninth sternite.)